

Damage Assessment of
Unauthorized Excavations by
Bell Atlantic - Virginia, Inc
Fort Harrison Unit
Richmond National Battlefield Park



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SUMMARY

On February 15, an instance of excavation without a permit as required by the Archeological Resources Protection Act of 1979 as amended (ARPA) occurred along Battlefield Park Road in the Fort Harrison Unit of Richmond National Battlefield (RICH). The unauthorized excavation was conducted by a contractor to Bell Atlantic - Virginia, Inc. in the process of installing a telephone line in violation of the existing right-of-way agreement. Two holes were excavated on the margins of Battle Park Road, disturbing a total of 10.5 cubic feet of soil. The following values were determined as a result of this unauthorized activity:

Repair and Restoration	\$1856.49
Commercial Value of Artifacts	\$2.00
Archeological Value	\$6932.96

The felony threshold for ARPA violation is monetary damage in excess of five hundred (500) dollars. The monetary amount is determined by combining (1) the cost of repair and restoration and the commercial value of the resource or (2) the cost of restoration and repair and the archeological value of the resource. In example (1) this amount is \$1858.49 and in example (2) the amount is \$8789.45. In both instances, the felony threshold is substantially exceeded.

TABLE OF CONTENTS

SUMMARY	i
TABLE OF CONTENTS	ii
LIST OF FIGURES	iii
LIST OF TABLES	iii
1.0 INTRODUCTION	1
2.0 AREA OF DAMAGE	4
3.0 METHOD OF ASSESSMENT	6
4.0 DAMAGE ASSESSMENT OF ARCHEOLOGICAL RESOURCES	12
4.1 Cost of Restoration and Repair	12
4.2 Commercial Value	14
4.3 Archeological Value	15
4.3.1. Previous Archeological Research	15
4.3.2 Research Design	15
4.3.2 Implementing the Research Design	16
References Cited	20

LIST OF FIGURES

Figure 1: Location of Unauthorized Excavations indicated by Arrow. Detail from USGS 1:24000 Series Drewry's Bluff Quadrangle.	2
Figure 2: Sketch Map of Unauthorized Excavations by Park Ranger Barry M. Krieg.	3
Figure 3: Location of Unauthorized Excavations. Detail from Property Identification Map of Henrico County p266.	7
Figure 4: Photograph of Unauthorized Excavations from East Side of Battlefield Park Road, looking West.	8
Figure 5: Photograph of Unauthorized Excavations from West Side of Battlefield Park Road, looking East.	8
Figure 6: Photograph of West Hole, East Profile.	10
Figure 7: Drawing of West Hole East Profile.	10
Figure 8: Photograph of East Hole, North Profile.	11
Figure 9: Drawing of East Hole, North Profile.	11

LIST OF TABLES

Table 1: Repair and Restoration Costs	13
Table 2: Assessment and Evaluation Costs	13
Table 3: Commercial Value of artifacts recovered as evidence.	14
Table 4: Archeological Value	18

1.0 INTRODUCTION

On Tuesday, February 16 I was contacted by RICH Acting Chief Historian Mike Andrus that excavations had been conducted by contractors to Bell Atlantic - Virginia, Inc. along Battlefield Park Road while installing a new telephone line in violation of the existing right-of-way agreement and possibly in violation of ARPA. Referencing the ARPA permit files, located in my office at the Philadelphia Support Office, I determined that no permit for excavation required by Section 4 of the Act had been requested or approved for the excavations and that the excavations were unauthorized.

Richmond National Battlefield Park was established by Congress "...set apart as a public park for the benefit and inspiration of the people..." including the "...lands, structures, and other property..." (16 U.S.C. sec 423J). Since the unauthorized excavations had damaged a section of the park immediately adjacent to Civil War earthworks eligible for listing on the National Register of Historic Places, I concluded that they had the potential to damage resources of archeological interest that were in excess of one hundred years old, and should be investigated for damage pursuant to ARPA.

On Wednesday, February 17 I traveled to RICH, leaving my residence at 5:30 AM, arriving at Park Headquarters at 10:30 AM.. Accompanied by Acting Chief Historian Mike Andrus I proceeded to the site of the unauthorized excavation. The unauthorized excavations were conducted immediately adjacent to Battlefield Park Road, approximately one-half mile from its intersection with New Market Road (Figure 1). Civil War Fort Gilmer is located approximately 500 feet to the southwest, and Civil War Fort Alexander is located approximately 1000 feet to the northeast. Both forts, as well as the entrance to the park are clearly marked with signs easily visible from the road.

Upon arrival at the site, two excavations of very recent origin were observed, located on either side of Battlefield Park Road, presumably for underground borings for a telephone line. Examination of the unauthorized excavations indicated their potential to damage resources of archeological interest, requiring an evaluation of their impact. I conducted these investigations throughout the remainder of the day, leaving the site at 5:30 PM. I returned to the Philadelphia Support Office the following day.

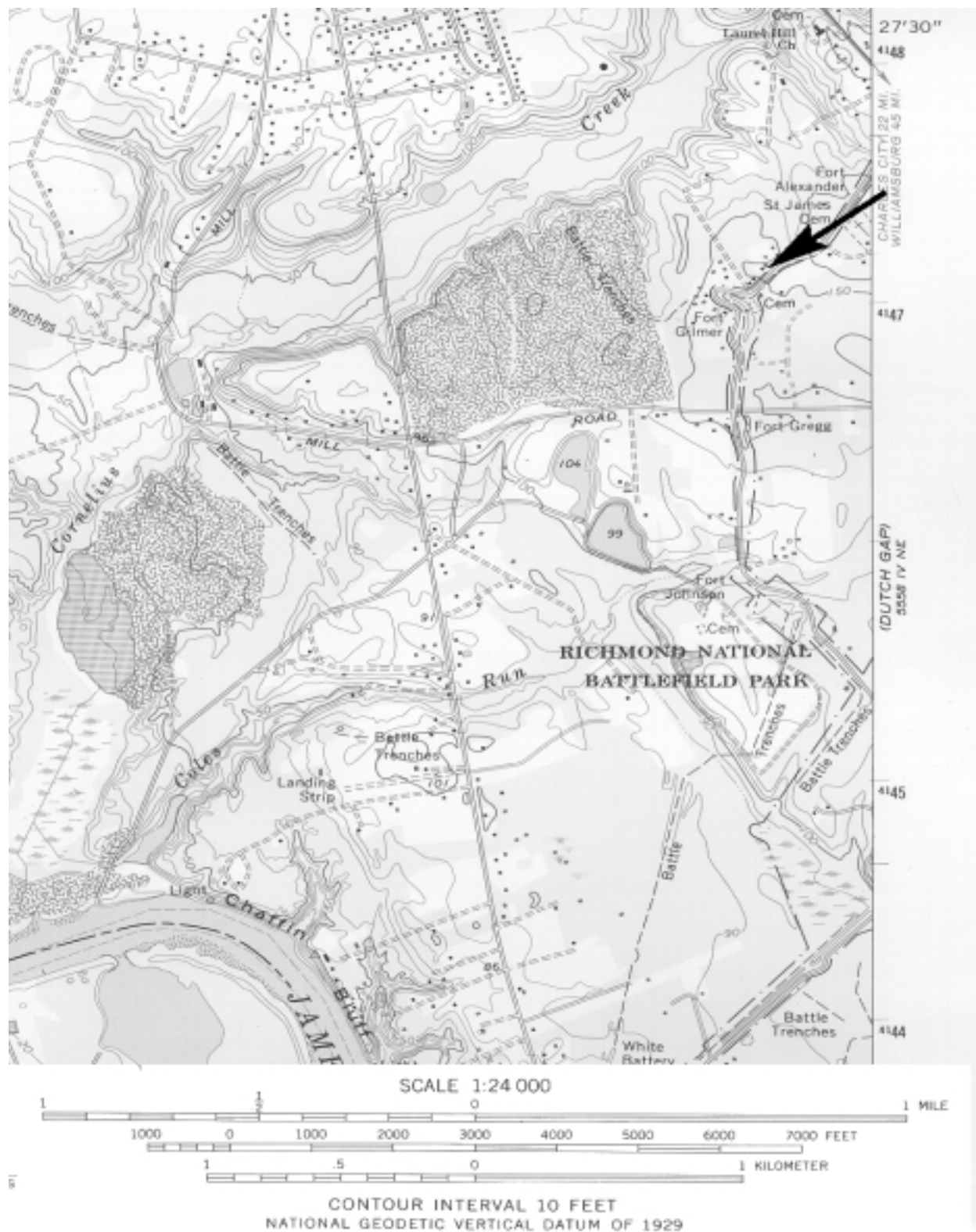


Figure 1: Location of Unauthorized Excavations indicated by Arrow. Detail from USGS 1:24000 Series Drewry's Bluff Quadrangle.

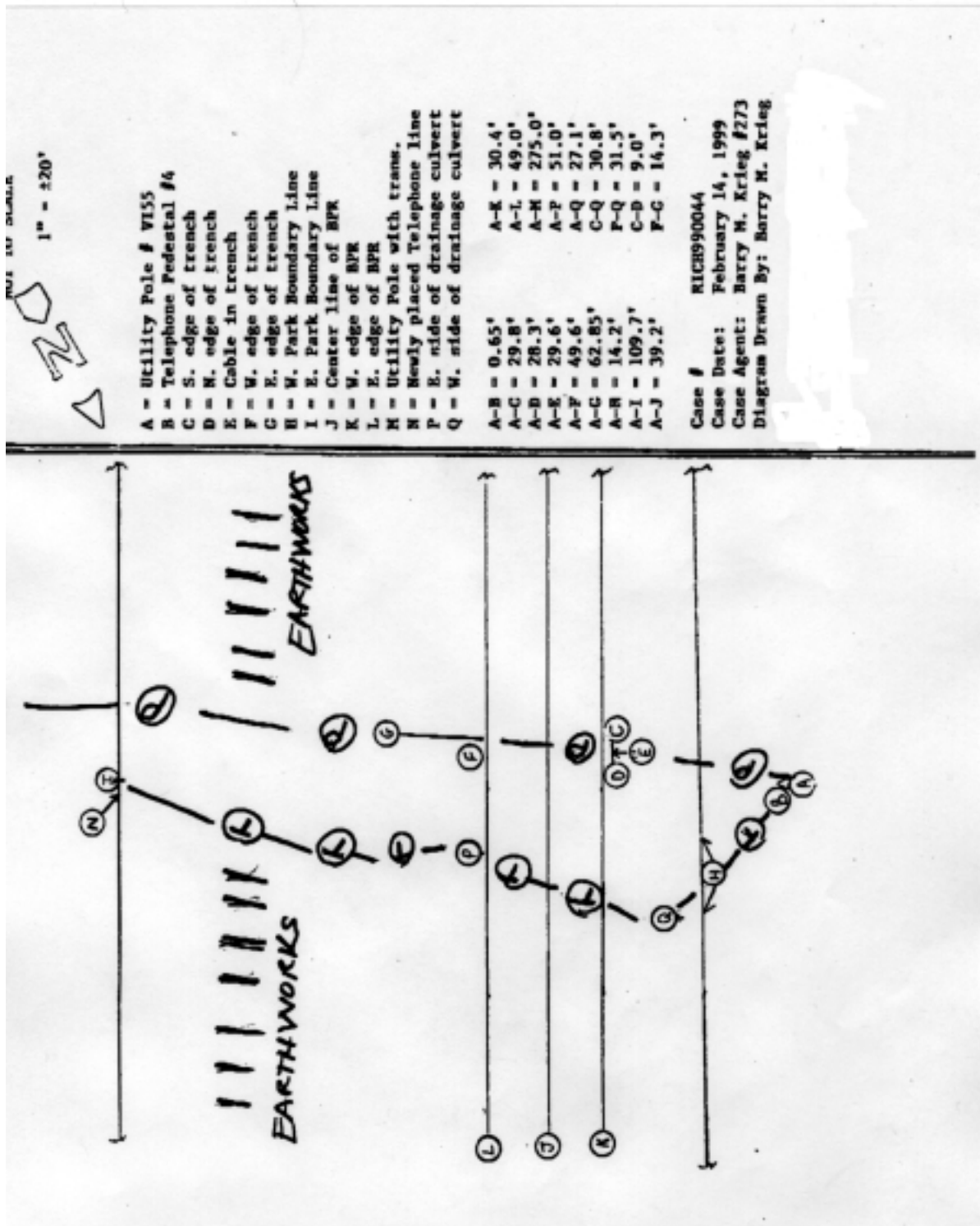


Figure 2: Sketch Map of Unauthorized Excavations by Park Ranger Barry M. Krieg.

2.0 AREA OF DAMAGE

The location of the unauthorized excavation is within the Fort Harrison Unit of Richmond National Battlefield Park, lying in Henrico County, Virginia. This unit contains the core resources associated with the Battle of Chaffin's Farm, and has been identified by the Congressional Civil War Sites Advisory Committee as one of the 50 "priority battlefields" in the nation (GMP/EIS:15). The core areas of these priority battlefields are defined as "...those places where the combat engagement and key associated actions and features were located; the core area includes, among other things, what often is described as "hallowed ground"...The core area is generally the part that should remain undisturbed..." (GMP/EIS:15).

The Fort Harrison Unit has had no archeological investigations in the area of the unauthorized excavation. Limited testing was conducted for a proposed land exchange on the Union side of the earthworks some two miles distant by the author in December, 1988. No significant resources were identified in that study (Cooper 1988). An archeological identification study for the Fort Harrison Unit has been identified as the park's highest remaining priority for the Systemwide Archeological Inventory Program. The National Park Service is currently conducting a Cultural Landscape Inventory project on the entire unit, attesting to both the significance of the area as well as the Service's ongoing preservation efforts to this important site.

The area of unauthorized excavation played a pivotal role in the battles associated with the failed attempt for early Union victory in the Overland Campaign in the Autumn of 1864. The Union attack on Confederate Ft. Harrison on September 29, 1864 was intended to prevent the Confederate Army from reinforcing the troops facing the Union siege at Petersburg. The successful attack captured Fort Harrison, forcing a realignment of the Confederate defenses. As part of the assault, troops from the 18th Army Corps under command of General Heckman, and the First, Second, and Third Brigades of the Second Division 10th Army Corps under command of General Robert S. Poster attacked Fort Gilmer from the front but were repulsed with heavy loss (O.R. Series 1, Volume XLII/1 [S#87]: 761, 794) before retiring to the New Market and Richmond Roads. U.S. Colored Troops saw heavy action in the vicinity of Fort Gilmer (near the unauthorized excavations). The attack resulted in heavy losses to the U.S. Colored Troops with "Many negroes...killed in the ditch." (O.R.--SERIES I--VOLUME XLII/1 [S# 87]: 873). After the battle, 119 Union soldiers were buried in front of Fort Gilmer (O.R.--SERIES I--VOLUME XLII/1 [S# 87]:934).

The attacks on Fort Gilmer were repulsed by the Confederate Brigades of Lawrs, Gregg's, and Benning's of the First Corps. After the assault, the Confederate line was held in part by Field's Division, Colquitt's Brigade and Hardaway's Light Artillery Battery (O.R.--SERIES I--VOLUME XLII/1 [S# 87]: 935). Later the Tenth, Eighteenth, and Twenty-fifth Battallions of City Troops (O.R.--SERIES I--VOLUME XLII/3 [S# 89]:645) and Corse's Brigade of Pickett's Division (O.R.--SERIES I--VOLUME XLVI/2 [S# 96]: X). After the battle the land in front of Fort Gilmer was fortified with "subterra shells" or land mines (O.R.--SERIES I--VOLUME

XLII/3 [S# 89]: 1181). The defenses between Fort Gilmer and the New Market Road were strengthened after the assault, including the labor of “...about 250 negroes...” (O.R.--SERIES I--VOLUME XLII/3 [S# 89]: X) and, for a short time, by Union prisoners of war (O.R.--SERIES I--VOLUME XLII/3 [S# 89]: 185) which were quickly removed after Union commanders employed Confederate captives for similar purposes at the excavation at Dutch Gap (O.R.--SERIES I--VOLUME XLII/3 [S# 89]: 286). The defenses were abandoned after the fall of Richmond on April 2, 1865.

3.0 METHOD OF ASSESSMENT

The site where the unauthorized excavations occurred lies on open ground adjacent to Battlefield Park Road (Figure 3) directly before the residence at #7884 Battlefield Park Road and consisted of two loci, one on either side of the road. The locations of these disturbances were documented by tape measure from existing features by Park Ranger Barry Krieg (Figure 3). Photographs of the unauthorized excavations are presented in Figures 4 and 5.

All observations were documented in a field notebook, including a photographic log. Information recording techniques consisted of cleaning all four exposed profiles and floor area of the unauthorized excavations. These were recorded by photography and measured drawings of the north profiles after determining they were representative of the remaining three profiles; all were however cleaned and examined for impact to archeological resources. Approximately half of the disturbed soils were screened through one-quarter-inch mesh to determine if artifact deposits had been impacted by the unauthorized excavation. Recovered artifacts were placed in plastic bags marked by their provenience. These were cleaned and examined in reference to standard archeological procedures. All materials including artifacts, field notes, and associated photographs are curated at the park under Accession number RICH-163.

The soils at the site of the unauthorized excavations are Caroline fine sandy loam, 6 to 10% slopes, eroded (Clay 1975).

“The Caroline Series consists of deep, well-drained, gently sloping to sloping soils that have a thick, dominant clayey subsoil. These soils formed in loamy and clayey Coastal Plain sediments.

In a representative profile the surface layer is pale-brown [10YR 6/3] very fine sandy loam 5 inches thick. The subsoil is 109 inches thick. The upper 5 inches is yellowish brown clay loam [10YR 5/6]. The next 11 inches is strong brown heavy clay loam [7.5YR 5/6], and below that 14 inches of yellowish-brown [10YR 5/8] and red [10YR silty clay and 26 inches of red, light gray, and light yellowish brown clay. The lower 53 inches is yellowish-brown, light gray, and red sandy clay loam. The substratum, at a depth of 114 inches, extends to depth of 134 inches or more. It is brown and dark-brown fine sandy loam that has white mottles.” (17)

The areas of unauthorized excavation were separated by Battlefield Park Road which links the State Route 5 to Fort Brady and Fort Maury, and constitutes a significant portion of the park’s driving tour, the principal interpretive experience at Richmond National Battlefield. The topmost soils beneath and adjacent to the road may have been impacted by its construction; however potential for preservation of deeper features and artifact concentrations remains in the undisturbed portions of the subsoil.

At the direction of the park, Bell Atlantic - Virginia, Inc. conducted Repair and Restoration activities at the location of the unauthorized excavations. No value was estimated for this activity for the purposes of determining the costs associated with the ARPA violation.

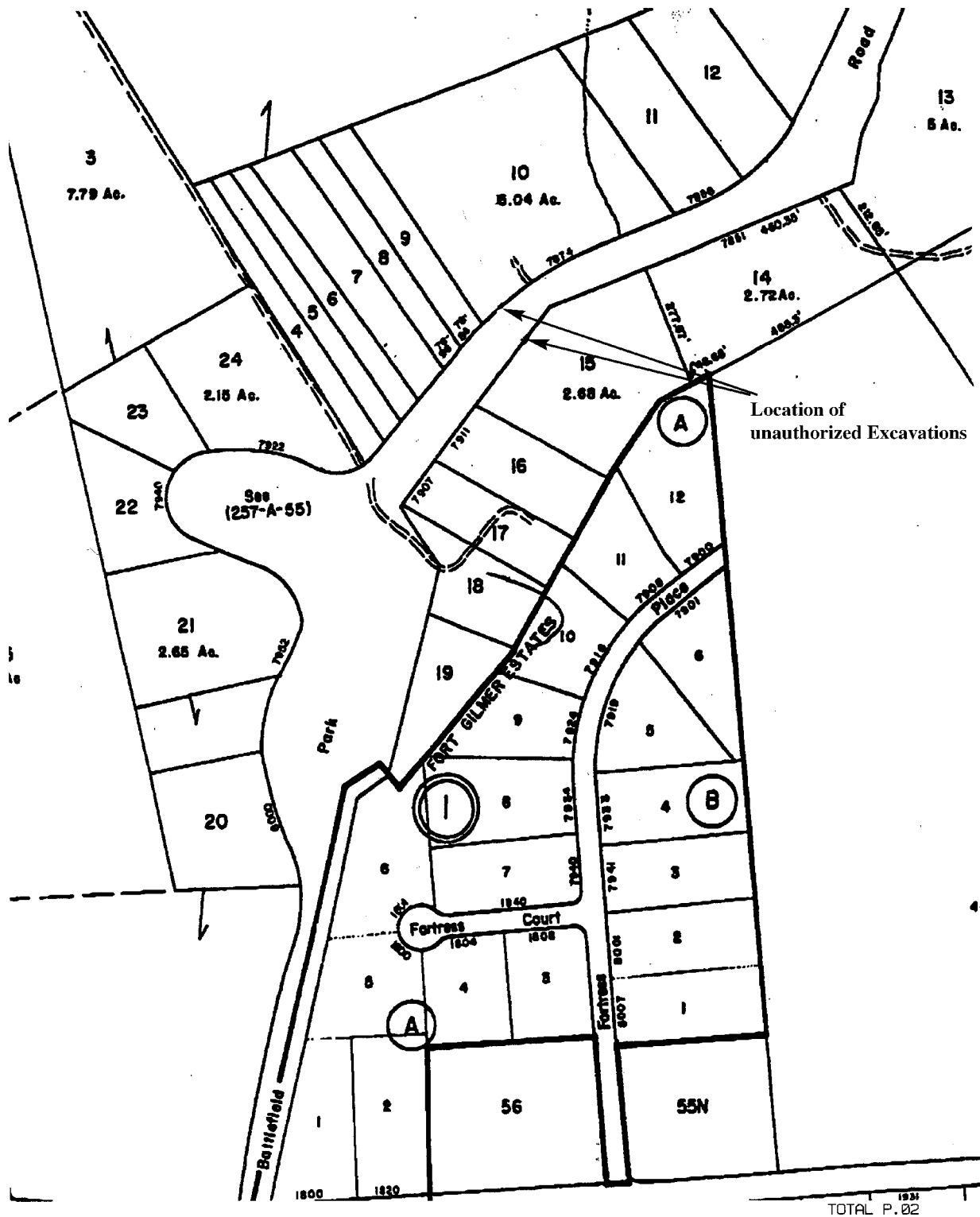


Figure 3: Location of Unauthorized Excavations. Detail from Property Identification Map of Henrico County p266.



Figure 4: Photograph of Unauthorized Excavations from East Side of Battlefield Park Road, looking West.



Figure 5: Photograph of Unauthorized Excavations from West Side of Battlefield Park Road, looking East.

The unauthorized excavation located on the west side of the road was oriented north/south and measured 4.3 feet long, 0.6 feet wide, and averages 2.4 feet in depth (or 6.2 cubic feet). It revealed the following stratigraphy (Figures 6 and 7):

1. Surface to 0.5 feet below surface contained dark grayish brown (Munsell color 10YR 4/2) silt loam.
2. 0.5 to 2.0 feet below surface contained mixed soils primarily composed of brown (Munsell color 10YR 4/3) silt loam with lenses of yellowish brown (Munsell color 10YR 5/4) silt loam and light reddish brown (Munsell color 10YR 6/3) silt loam.
3. 2.0 feet to bottom of excavation contained light reddish brown (Munsell color 10YR 6/3) silt loam.

Approximately half of the soil displaced by the unauthorized excavation was screened for the presence of artifacts, producing on cut nail fragment and a fragment of whiteware ceramic. These artifacts have a *terminus post quem* (TPQ) of 1790 and 1820 respectively and had the potential to originate from archeological deposits associated with the Civil War activities at the site.

The unauthorized disturbance located on the east side of the road measured 6.2 feet long by 0.6 feet wide, and had a maximum depth of 2.3 feet at its western margin, tapering to the surface (or a volume of 4.3 cubic feet). It revealed the following stratigraphy (Figures 8 and 9) :

1. Surface to 0.6 feet below surface contained very dark gray (Munsell color 10YR 3/1) silt loam.
2. 0.6 to 1.7 feet below surface contained mixed soils composed of yellowish brown (Munsell color 10YR 5/4) silt loam, dark yellowish brown (Munsell color 10YR 4/4) clay loam, and dark yellowish brown (Munsell color 10YR 4/6) clay loam.
3. 1.7 to bottom of excavation contained yellowish brown (Munsell color 10YR 5/4) clay loam.

Screening of approximately half of the soil did not recover any artifacts.

No archeological features were identified within the areas of unauthorized excavation. Two artifacts, recovered from the disturbance on the west side of Battlefield Park Road, indicate the potential for the preservation of both features and artifact concentrations associated with the construction, maintenance, garrisoning, and defense of the adjacent earthwork. Resources of this type have the potential for addressing important archeological research questions. Examination also revealed that the construction of Battlefield Park Road had disturbed the first 1.7 to 2.0 feet of the natural soil stratigraphy when compared with undisturbed Caroline fine sandy loam soils.

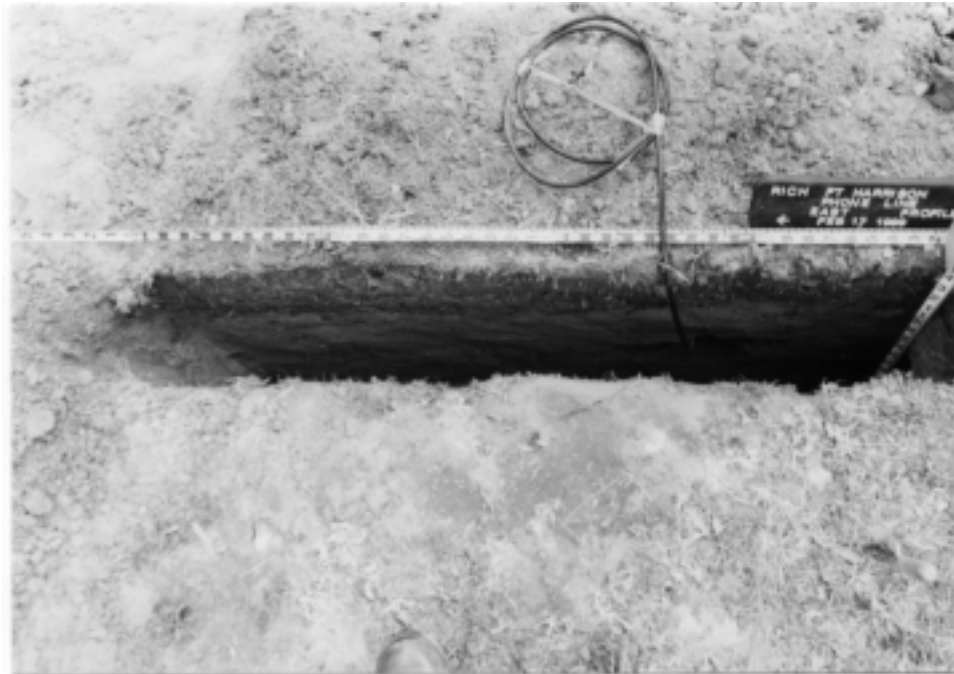


Figure 6: Photograph of West Hole, East Profile.

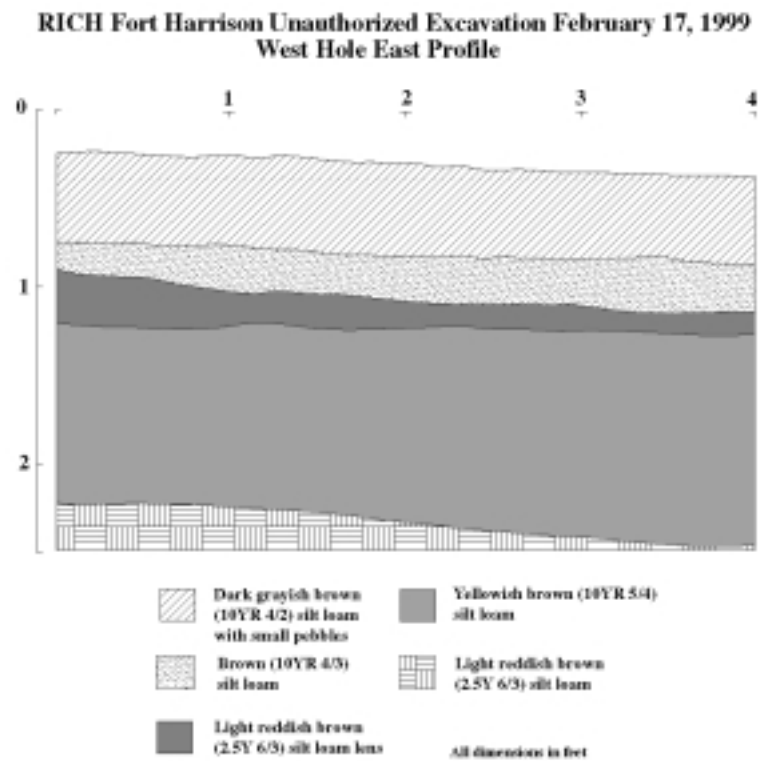


Figure 7: Drawing of West Hole East Profile.

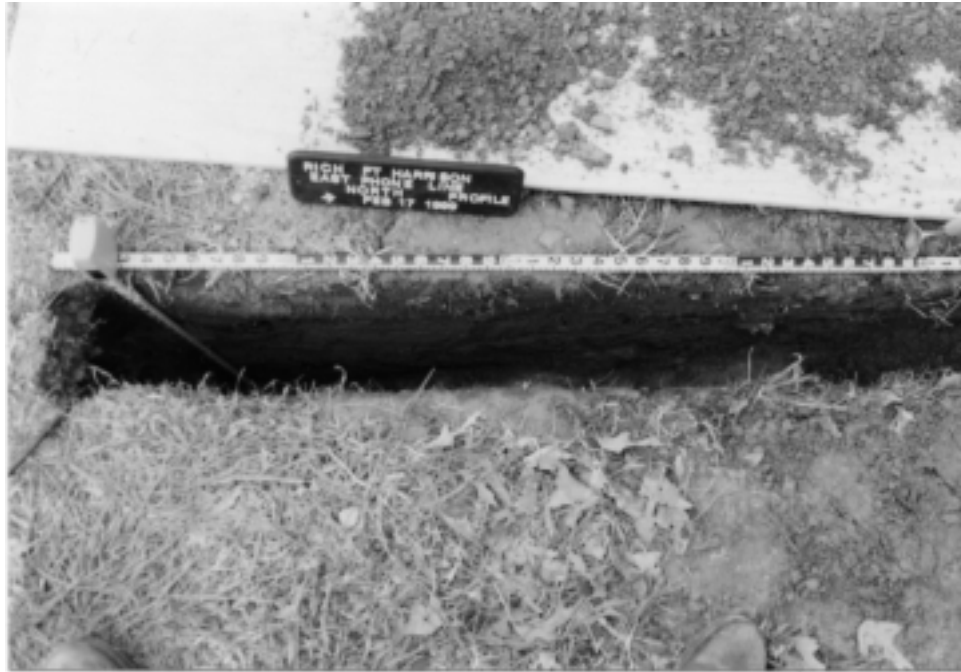


Figure 8: Photograph of East Hole, North Profile.

**RICH Fort Harrison Unauthorized Excavation February 17, 1999
East Hole North Profile**

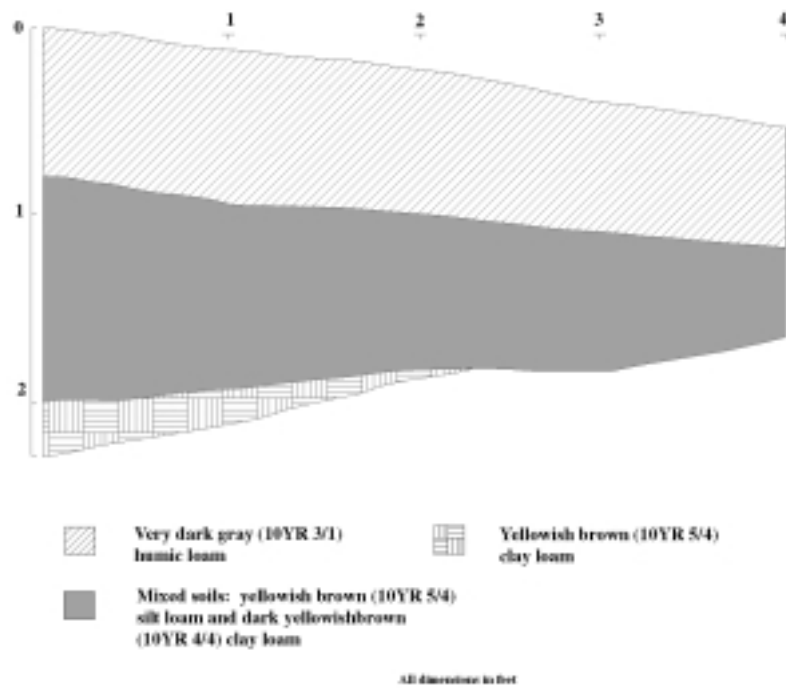


Figure 9: Drawing of East Hole, North Profile.

4.0 DAMAGE ASSESSMENT OF ARCHEOLOGICAL RESOURCES

Damage assessment to Federally owned or controlled archeological resources in violation of the Archeological Resources Protection Act of 1979, as amended (16 U.S.C. 470aa-470mm) can be obtained by determining three values: archeological value, commercial value, and the cost of restoration and repair to the resource. Guidelines for conducting such assessments to determine a monetary value are contained in 36 CFR 43.14. The criteria for determining these values and the values obtained are as follows:

4.1 Cost of Restoration and Repair:

...the cost of restoration and repair...shall be the cost already incurred for emergency restoration and repair, which may include, but need not be limited to, the cost of the following: (1)reconstruction of the archeological resource; (2)stabilization of the archeological resource; (3)ground contour reconstruction and surface stabilization; (4)research necessary to carry out reconstruction or stabilization; (5)physical barriers or other protective devices, necessitated by the disturbance of the archeological resource, to protect it from further disturbance; (6)examination and analysis of the archeological resource including recording remaining archeological information, where necessitated by disturbance, in order to salvage remaining values which cannot be otherwise conserved; (7)reinterment of human remains...; and (8)preparation of reports relating to any of the above activities (7 CFR 43.14 (C)).

The cost of restoration and repair (Tables 1 and 2) was computed using the specific criteria (items 2, 6, and 8) contained in the guidelines quoted above. Table 1 represents the costs incurred for stabilization of the archeological resources by relocation of the telephone service through an existing culvert; this includes on-site consultation and monitoring of the subsequent excavations. The contractor to Bell Atlantic - Virginia, Inc. provided all manpower and materials to stabilize the soil and re-seed the disturbed areas. Table 2 represents the costs for assessing the damage from the unauthorized excavations including travel, report preparation, cataloging of the archival and artifact collection, and curation to the standards of 36CFR Part 79 (Curation of Federally Owned or Administered Archeological Collections) in perpetuity. This value totals \$1856.49.

Table 1: Repair and Restoration Costs.

<u>Activity</u>	<u>Rate/Hour</u>	<u>Hours</u>	<u>Amount</u>
Archeologist GS12/05	\$34.31	4	\$137.24

Table 2: Assessment and Evaluation Costs

<u>Activity</u>	<u>Rate/Hour</u>	<u>Hours</u>	<u>Amount</u>
Mapping and Recording Damage			
Archeologist GS12/05	\$34.31	12	\$412.44
Report Preparation			
Archeologist GS12/05	\$34.31	24	\$824.88
Supplies and Materials			
Film (1 roll Kodak Gold @ \$4.60/roll)			\$ 4.60
Film Processing (1 roll C-36 processing @ \$13.00/roll)			<u>\$ 13.00</u>
Subtotal			\$17.60
Accession Collection			
Catalog specimens (\$3.00 per object X 2)			\$ 6.00
Materials			
Archival bags and boxes			\$ 13.00
Curation of artifacts and records *1 box @ \$250.00/box)			<u>\$250.00</u>
Subtotal			\$269.00
Travel Expenses			
Archeologist Cooper			\$195.33
Total			\$1719.25

4.2 Commercial Value

...commercial value of any archeological resource involved in a violation...shall be its fair market value. Where a violation has resulted in the damage of the archeological resource, the fair market value should be determined using the condition of the archeological resource prior to the violation, to the extent that its prior condition can be ascertained [7 CFR 43.14(b)].

The commercial value of the artifacts recovered from the unauthorized excavations is quite low as neither recovered artifact lacking detailed provenience information may be directly attributable to the Civil War. Commercial value was determined by the author. The total commercial value of the artifacts recovered as evidence was \$2.00.

Table 3: Commercial Value of artifacts recovered as evidence.

Number	Description	Count	Value
1	Cut nail (AD1790 - 1999)	1	\$1.00
2	Whiteware ceramic sherd (AD 1820 - 1999)	1	<u>\$1.00</u>
TOTAL			<u>\$2.00</u>

4.3 Archeological Value

This value shall be appraised in terms of the cost of retrieval of scientific information which would have been obtainable prior to the violation. These costs may include, but need not be limited to, the production of a research design, conducting field work, carrying out laboratory analysis, and preparing reports as would be necessary to realize the information potential [7 CFR 43.14(a)].

Archeological investigations conducted by the National Park Service is guided by the development and implementation of explicit research designs. These are formulated in consultation with the Commonwealth of Virginia's Department of Historic Resources under Section 110 of the Historic Preservation Act of 1966 (as amended) (Public Law 89-665; 80 STAT.915; 16 U.S.C. 470) [Section 110 Guidelines published in the Federal Register on February 17, 1988 (53 FR 4727-46)]. Archeological research questions, especially those associated with historic sites, are guided by the standards established in Bulletin 36 of the National Register of Historic Places. Bulletin 36 recognizes archeological significance in four broad categories, listed as Criterion A through D. The resources in the vicinity are significant under the following criteria: A) Sites "...associated with events that have made a significant contribution to the broad patterns of history; C) Sites "...that embody the distinctive characteristics of a type, period, or method of construction..." The Fort Harrison Unit (as has much of the National Park Service's archeological resources) has not been formally evaluated under Criterion D, sites "...that have yielded, or may be likely to yield, information important in prehistory or history." Richmond National Battlefield Park is conducting a systematic inventory of its archeological resources through the Cultural Resource Preservation Program at the Gaines' Mill and Malvern Hill Units. The Fort Harrison Unit will be the next unit evaluated for these resources due to the extent and complexity of the fortifications, and that this study will document their significance under Criterion D.

4.3.1. Previous Archeological Research

The only controlled archeological excavation at the Fort Harrison Unit was conducted for a proposed land exchange on the Union side of the earthworks some two miles distant by the author in December, 1988. No significant resources were identified in that study (Cooper 1988).

4.3.2 Research Design

Archeological investigations at historic sites are a vital adjunct to the historical record. Even well-documented events such as the American Civil War are recorded from the perspectives of the time and usually ignore or under-document events that are considered significant by today's standards of scholarship. This is especially true of the large population of participants who were viewed as simply implementing the will or direction of their political or military leaders. This is doubly true of the Confederate armies that both lacked the resources for complete documentation, as well as the loss of relevant records after the fall of their government. The

voices of the diverse populations that participated in the Civil War, on both sides, have been permanently muted by the passage of time. Whispers of those voices remain in the material culture in their encampments, battlefields, and ruins of their fortifications which are accessible through archeological science.

The chronology of the Civil War is thoroughly documented, evidenced by both the abundant literature arising immediately after the war as well as that from the public's current fascination with those events. The material culture is equally well documented, evidenced by both its origin in industrial production and tested in today's lucrative antiquities market where Civil War artifacts reach unprecedented values. Implementation of an archeological investigation designed to address the research potential of the site for the area disturbed by the unauthorized excavation would require the following:

4.3.2 Research Design

Specific research questions applicable to battlefields that archeology may address are:

1. Were the armies equipped with the weapons and accouterments as documented?
2. How were these weapons deployed during battle? In what quantities?
3. How did these weapons, especially novel ones, perform at first? On subsequent uses?
4. Which specific units were employed during the engagement?
5. Does the distribution of features and artifacts reflect the historical documentation of the battle?
6. What was the direct effect of the battle on the civilian population?
7. Was there differential use of U.S. Colored Troops compared with white troops?
8. What was the fate of the casualties? Were they buried in place? Was there subsequent removal? Is there evidence of field hospitals and what was their level of care there?

Specific research questions applicable to encampments that archeology may address are:

1. How did the troops occupy themselves between battles?
2. What undocumented components of the encampment existed (mess halls, latrines, magazines)? How were they spatially organized?
3. What types of foods were supplied for each army? What was the total level of supply?
4. How were supplies consumed? In common messes? At individual posts?
5. What level of contact did the residents have with the civilian population?

Most, if not all of these questions may be addressed in the area containing the unauthorized excavation. The unauthorized excavation occurred on the Confederate portion of the Fort Harrison Unit earthworks. As outlined above in "Area of Damage" the location was both an encampment area and site of a significant battle in the Overland Campaign of 1864. Moreover, the earthworks were constructed and garrisoned by 1862, potentially leaving an archeological record encompassing the entire duration of the Civil War and adding an extended timeline to address all of these questions. The encampment location may be unique as containing the quarters for the Union prisoners of war briefly used to repair the earthworks.

Many of these questions have been successfully addressed at the Confederate Picket Line at Petersburg National Battlefield (Blades 1981). The comparison of similar resources at the northern end of the Confederate lines would dramatically increase the utility of those results.

4.3.3 Implementing the Research Design

The computed volume of soil resulting from the unauthorized excavation amounts to approximately 10.5 cubic feet of soil. To archeologically excavate the equivalent volume of soil would require the excavation of a three by three foot archeological test. Units of this size are regularly used to recover contextual information and statistically significant artifact samples that could address the research design posed above. Excavation units of this size are expected to contain complex archeological features such as intersecting hearths, refuse pits, and defensive features, all of which require meticulous excavation by hand. It is precisely this type of study that is developed for an Archeological Identification Study. The archeological value described below is based on excavation of a controlled excavation unit and the costs associated for planning, curation, and reporting (Table 4). The costs below do not include specialized studies if specific categories of information are discovered, such as zooarchaeological studies, palynological studies, or forensic studies if human burials are identified.

The research design must be supported by a geophysical prospecting survey. These have been conducted on all significant National Park Service Civil War archeological sites prior to excavation for the past decade. They serve to identify those areas which will allow for retrieval of information relevant to the research design, so that resources are not disturbed in the hunt for specific types of features. They consequently reduce the cost of excavation.

Table 4: Archeological Value

<u>Activity</u>	<u>Rate/Hour</u>	<u>Hours</u>	<u>Amount</u>
<u>Research Design</u>			
<u>Historical Background Research</u>			
Historian (GS-13)	\$37.13	8	\$297.04
<u>Design Archeological Work</u>			
Archeologist (GS-12)	\$31.47	12	\$377.64
<u>Word Processing (GS-5)</u>	\$14.32	4	\$57.28
<u>Map Production</u>			
Scientific Illustrator (GS-7)	\$17.74	12	<u>\$212.88</u>
Subtotal			\$944.84
<u>Archeological Field Work</u>			
<u>Establish Survey Control</u>			
Archeologist (GS-11)	\$26.26	4	\$105.04
Archeology Technician (GS-5)	\$14.32	4	\$57.28
<u>Geophysical Prospecting</u>			
Magnetic Survey			
Archeologist (GS-11)	\$26.26	8	\$210.08
Archeology Technician (GS-5)	\$14.32	8	\$114.56
Resistivity Survey			
Archeologist (GS-11)	\$26.26	8	\$210.08
Archeology Technician (GS-5)	\$14.32	8	\$114.56
<u>Controlled Excavation</u>			
Archeologist (GS-11)	\$26.26	16	\$420.16
Archeology Technician (GS-5)	\$14.32	16	\$229.12
<u>Back-fill and Restore Excavations</u>			
Archeology Technician (GS-5)	\$14.32	2	\$28.64
<u>Review and Check Field Data</u>			
Archeologist (GS-11)	\$26.26	4	\$105.04
<u>Park Coordination and Administration</u>			
Archeologist (GS-11)	\$26.26	4	<u>\$105.04</u>
Subtotal			\$1699.60
<u>Travel</u>			
Lodging and per diem	\$80.00/day	8 days	\$640.00
<u>Laboratory Processing</u>			
<u>Artifact cleaning</u>			
Archeology Technician (GS-5)	\$14.32	12	\$171.04
<u>Analyze artifacts</u>			
Archeologist (GS-11)	\$26.26	12	\$315.12
Archeology Technician (GS-5)	\$14.32	24	<u>\$343.68</u>
Subtotal			\$829.84

<u>Activity</u>	<u>Rate/Hour</u>	<u>Hours</u>	<u>Amount</u>
Curation Activities			
<u>ANCS Cataloging</u>			
Archeologist (GS-11)	\$26.26	12	\$315.12
Archeology Technician (GS-5)	\$14.32	24	\$343.68
<u>Bags, forms, etc.</u>			\$75.00
<u>Curation (2 boxes)</u>	\$250.00		<u>\$500.00</u>
Subtotal			\$1233.80
Report Preparation and Production			
<u>Write report</u>			
Archeologist (GS-11)	\$26.26	24	\$630.24
<u>Prepare figures, maps</u>			
Scientific Illustrator (GS-07)	\$17.74	24	\$425.76
<u>Photograph processing</u>	\$13.00 roll	4	\$52.00
<u>Word Processing</u>			
Secretary (GS-05)	\$14.32	12	\$171.84
<u>Copy editing</u>			
Writer/editor (GS-11)	\$26.26	4	\$105.04
<u>Collating, printing, and binding</u>			<u>\$200.00</u>
Subtotal			\$1584.88
TOTAL			\$6932.96

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